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June 29, 2007

2008 Building Energy Efficiency Standard comments

To: Chris Gekas
California Energy Commission
1516 Ninth Street, MS 25
Sacramento, CA 95814-5512

Dear Mr. Gekas,

My comments on the proposed 2008 Building Energy Efficiency Standard for Fault Diagnostics and Detection (FDD) concept are given below.

1. Overall, I believe the FDD concept has the potential to save a significant amount of energy and I believe it would benefit many facility owners. I'm not familiar with the California Energy Commission's terminology, but based upon the cover letter forwarding the proposed standards for review I believe the term "compliance option" means the use of these algorithms is not mandatory but instead may be specified by the building owner. That would seem to be a prudent approach, at least until they have proven themselves in non-experimental installations. Even if the use of the algorithms is not mandatory, however, I believe the approval of this standard should be delayed until the patent claim of Johnson Controls is resolved. It is my understanding that Johnson Controls is asserting that their patent covers the basic concept of using automatic controls to implement Fault Detection and Diagnostics. If this claim is valid, then this standard is essentially mandating use of a proprietary technology. Until this issue is resolved, many control vendors (including Automated Logic) may be reluctant to develop and distribute control programs which could infringe upon Johnson Controls' intellectual property.
2. The description on page 2 of the VAV AHU standard states that the algorithms can detect faults "without additional hardware requirements." Some of the algorithms do require sensors that may not be present on all systems, such as a discharge air temperature sensor on a VAV box or a mixed air temperature sensor on an AHU. The cost of these sensors should be minor compared to the potential savings, but anyone considering applying these algorithms on a retrofit project or applying them to a new project where the controls are purchased separately from the hardware needs to be aware of the requirement for these sensors.
3. The requirements on page 4 of the VAV AHU standard states that the tool shall be capable of detecting sensor drift or fault in the VAV box. I don't believe the algorithms have the ability to detect drift in the room sensor, which measures the primary variable being controlled by the VAV box, nor drift in the airflow sensor in a pressure independent VAV box.

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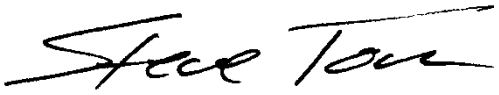
4. Also on page 4 of the VAV AHU standard there is a requirement for the VAV box to detect a disconnected inlet duct. I believe this requirement could only be met by pressure independent VAV boxes, but even in those boxes I'm not certain it would be possible to distinguish a disconnected inlet duct from a disconnected or slipping damper actuator, a blocked duck, or a faulty flow sensor. Any of those conditions would result in a "no flow" reading when the AHU was running and the damper actuator indicated the damper was open. It would probably be more realistic to simply require the VAV box to detect the abnormal flow condition and list possible causes.

5. The term "Roof Top Unit" or "RTU" in the RTU standard may be misleading. There is, unfortunately, a great variation in the terminology used by various manufacturers and engineers within our industry. ASHRAE defines a few types of systems in their Systems handbook, but they don't define the term "RTU." In the field, this term is often applied to VAV air handling units, multizone air handling units, and other types of roof-mounted mechanical equipment regardless of whether it has packaged controls or built-up controls. The proposed RTU standard may not appropriate for these types of equipment. On the other hand, the proposed RTU standard may be applicable to unitary air conditioners and heat pumps which are not be placed on the roof and which therefore would not normally be called a Roof Top Unit. On page 5 the proposed standard implies that it is intended for use in "unitary air conditioners and heat pumps," and I believe this is a more accurate description of the intended scope of this standard.
6. Is NIST researching any FDD algorithms for unitary air conditioners that will be placed in the public domain? That might encourage wider acceptance of this standard.



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